



INDIAN SCHOOL AL WADI AL KABIR



Class: VIII	Department: SCIENCE	Date of completion: 07.10.2021
Worksheet No:8 WITH ANSWERS	Topic: FRICTION	Note:A4 FILE FORMAT
Name of the student:	Class & Section:	Roll no.

I. VERY SHORT ANSWERS (1M):

1. How is friction caused? [Friction is caused by the irregularities on the two surfaces in contact.]
2. Grooves are provided in the soles of shoes. Give reason. [Grooves makes the surface rough and increases friction]
3. Is it possible to reduce friction to zero by polishing surfaces or using lubricants? Explain. [Friction can never be eliminated but it can be reduced. No surface is perfectly smooth. Some irregularities are always there on surfaces.]
4. Explain why, it is easier to drag a mat on the floor when nobody is sitting on it but much more difficult to drag the same mat when a person is sitting on it. [Heavier mass will press harder into the irregularities and offers greater resistance to motion that is greater friction]
5. Define lubricants. Give two examples of lubricants. [A lubricant is a substance that forms a thin layer between the two surfaces in contact. It fills the depressions on the surface and makes it smooth thus helping in reducing friction. e.g., Oil, grease]
6. When does static friction come into play? [Static friction comes into play when we try to move an object from rest.]
7. When the cutting edge of a knife is put against a fast-rotating stone to sharpen it, sparks are seen to fly. Explain the reason. [Heat is produced as a result of friction between a knife and the rotating stone. As the speed of rotation increases the amount of heat generated also increases which result in the sparks.]
8. What is drag? State the factors affecting friction on an object in a fluid? [The frictional force exerted by fluids is called drag. Factors affecting friction are speed, shape, size of the object and nature of the fluid]
9. Why does an aeroplane have a streamlined shape? [Aeroplanes have a streamlined shape to reduce friction offered by fluid.]

II. ASSERTION AND REASON

For question numbers 10 to 12, two statements are given- one labelled Assertion (A) and

the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below-

- i) Both A and R are true and R is the correct explanation of the assertion.
- ii) Both A and R are true but R is not the correct explanation of the assertion.
- iii) A is true but R is false.
- iv) A is false but R is true

10. Assertion (A): Friction increases with increase in mass.

Reason (R): A rough surface has more irregularities than smooth surface.

(ii) Both A and R are true but R is not the correct explanation of the assertion.

11. Assertion (A): The streamlined shape of birds and fishes does not help them move easily in fluids.

Reason(R): This streamlined shape helps in overcoming drag without spending much energy.

(iv) A is false but R is true

12. Assertion (A): Wheels are said to be one of the greatest inventions of mankind.

Reason(R): Wheels decreases friction and makes movement of things easier.

(i) Both A and R are true and R is the correct explanation of the assertion.

III.PASSAGE BASED QUESTIONS:

Friction is a force between two surfaces that are sliding, or trying to slide, across each other. Friction always works in the direction opposite to the direction in which the object is moving, or trying to move. It always slows a moving object down.

Friction also produces heat. If you rub your hands together quickly, you will feel them get warmer. Friction can be a useful force because it prevents our shoes slipping on the pavement when we walk and stops car tyres skidding on the road. When you walk, friction is caused between the tread on shoes and the ground. This friction acts to grip the ground and prevent sliding. Sometimes we want to reduce friction. For example, we use oil to reduce the friction between the moving parts inside a car engine. In many machines, friction is reduced by using ball bearings. The reduced friction means there is less wear on the moving parts and less heat produced.

i) Friction between two surfaces is due to its_____.

- a) Overlapping
- b) Overriding
- c) Interlocking**
- d) Interface

ii) If we apply oil on door hinges, the friction will:

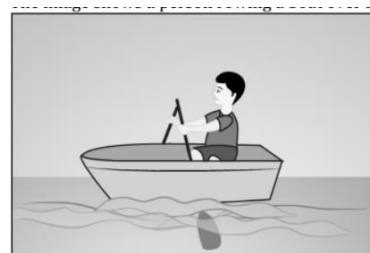
- a) Increase
- b) Disappear altogether
- c) Decrease**
- d) Will remain unchanged

- iii) Gymnasts apply some coarse substance on their hands to:
- Increase friction for better grip
 - Decrease friction
 - Play fast
 - None of these
- iv) To sharpen the blade of a knife by rubbing it against a surface, which of the following will be most suitable:
- Stone
 - Wooden block
 - Plastic block
 - Glass block
- v) Most of the machines use ball bearings in order to reduce friction. How is rolling more efficient than sliding?
- The mass of the object reduces
 - It provides lubrication between the surfaces
 - Interlocking between the surfaces increases
 - The area of contact between the surfaces is less.

IV.CASE STUDY BASED QUESTIONS:

Boats and ships are narrow in front and sloping on sides. This is known as 'streamlined shape'. Streamlined shape reduces friction from fluid medium through which these objects move. Water offers friction to the sailing ship. Water offers very small friction in a motion. Racing cyclists crouch down low on their bikes to reduce the air resistance on them. This helps them to cycle faster. They also wear streamlined helmets. These have special, smooth shapes that allow the air to flow over the cyclist more easily. Modern cars are also streamlined. Their smooth shapes make the air resistance smaller, which allows them to travel further on the same amount of fuel.

- i) The image shows a person rowing a boat over a river. Identify the number of bodies experiencing friction.
- 1, boat because of the river
 - 1, boat because of the person
 - 2, boat because of the river and the person because of air
 - 2, boat because of air and river and the person because of air



- ii) In a cycling race, it is observed that a cyclist normally bends his body as shown in the figure. he cyclist bends in order to:
- Feel comfortable.
 - Reduce his weight.
 - Reduce the air drag.
 - Increase energy consumption.



V a) SHORT ANSWER TYPE QUESTIONS (2 M):

- What is spring balance? (Hint-Spring balance is a device used for measuring the force acting on an object. It consists of a coiled spring which gets stretched when a force is

applied to it. Stretching of the spring is measured by a pointer moving on a graduated scale. The reading on the scale gives the magnitude of the force.)

- Two blocks of iron of different masses such as 1 unit and 2 units are kept on a cemented floor. Which one of them would require a larger force to move it from the rest position?

[Hint: The block having mass 2 units will require larger force to move it from the rest position because frictional force increases as the mass of object increases and hence larger mass require a larger force to move it from the rest position.]



- Explain the advantages of using ball bearings by citing examples. [Hint-Ball bearings are small spherical balls which are placed between two cylindrical surfaces. It minimizes the area of contact and reduces friction. It also converts sliding friction to rolling friction. It is used between hubs and axles of ceiling fans and bicycles.]

V.b) SHORT ANSWER TYPE QUESTIONS (3 M):

- A boy is moving from east to west. In which direction is the force of friction acting when he walks. [Hint: The frictional force exerted by ground on the person is in the direction of his movement. When a person is trying to move, the direction of motion of the particles on his feet is in the backward direction. Frictional force is in such a direction as to oppose relative motion between two bodies at the point of contact. Hence in this case, frictional force will be in the direction of motion]
- Describe two ways each of reducing friction and increasing friction.
[Hint-Reducing friction- We sprinkle powder on carrom board to reduce friction. A bicycle and a motor mechanic uses grease between the moving parts of these machines to increase efficiency of moving parts. Increasing friction-Kabaddi players rub their hands with soil for a better grip of their opponents. Sportsperson have spikes in the soles of their shoes. This increases friction and helps them to get a firm grip on the ground.]
- Give three examples each where friction is a disadvantage and where it is useful.[Hint-Disadvantages of Friction: Friction produces unnecessary heat leading to the wastage of energy, Forest fires are caused due to the friction between tree branches, A lot of money goes into preventing friction and the usual wear and tear caused by it by using techniques like greasing and oiling. Advantages of Friction-It helps us walk on the ground, brakes in a car

make use of friction to stop the car and meteors are burnt in the atmosphere before reaching Earth due to friction.]

VI. LONG ANSWER TYPE QUESTIONS (5M):

1. Give reasons
 - a) The jar of a mixer becomes hot if it is run for a few minutes. [friction produces heat]
 - b) A pencil will write on a paper but not on a glass. [friction is more on paper than glass]
 - c) It is easier to roll an object than sliding it. [rolling reduces friction]
 - d) Sometimes when you wash utensils, they slip from your hand. [Smooth surface offers less friction]
 - e) We sprinkle talcum powder on a carrom board. [Talcum powder makes surface smooth and reduces friction]

2. (i) Name the following-
 - a) An invisible force acting in opposite direction to the direction of motion- **Friction.**
 - b) The resistance offered by air to objects moving through it- **drag**
 - c) The friction acting when a block of wood kept on a cylindrical iron rod- **rolling**

(ii) Three children are at work. One is pushing chair, another is pushing the sofa and the third one is pushing an empty trolley. Who is experiencing the maximum friction? Why? [The child pushing the sofa will experience the maximum friction as sofa is the heaviest and friction increases with mass.]

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